



APPLICATION REPORT Water & Wastewater

Online measurement of turbidity in a drinking water distribution station

- Reliable monitoring of drinking water quality by way of dynamic scattered light measurement
- Rapid response time in case of sudden contamination
- Trend recording as evidence of drinking water safety for the water authorities

1. Background

As a multi-utility provider, Linz AG is responsible for energy supply, public transport, and municipal services for the city of Linz, Austria, and other municipalities in the state of Upper Austria. The company's activities include the supply of drinking water in the region.

2. Measurement requirements

Linz AG operates several drinking water distribution stations in the greater Linz area. Monitoring of the drinking water's quality parameters is done at those stations before distribution to private households and industrial consumers. One of the most important water supply field parameters is turbidity since drinking water should always be clear and free of undissolved substances. If the turbidity changes abruptly, this may indicate mineral, organic or biological contamination. Evidence of turbidity monitoring must be available for the water authority.

The drinking water delivered to consumers must be "acceptable and without abnormal change". The stringent standards for drinking water are also reflected in the limit values set for the distribution facility. A warning is triggered at a value of 0.1 NTU. If a value of 0.2 NTU is exceeded, then an alarm is activated.

To consistently monitor the drinking water quality to this level, this application requires a continuous dynamic measurement that responds quickly to changing drinking water turbidity. The previous instrumentation no longer met the requirements and had to be upgraded in three distribution stations.

Process parameters	
Medium	Water
Turbidity	<0.2 NTU
Operating density	997 kg/m ³
Pressure	1.2 bar / 17.4 psi
Temperature	+10...12°C / +50...53.6°F
Viscosity	1.297 mPas

3. KROHNE solution

Since KROHNE has a long standing relationship with Linz AG for flow and conductivity measurement instrumentation, KROHNE was given the opportunity to qualify and compete for this project. In the end, after a detailed selection process, the OPTISYS TUR 1060 turbidity measurement system prevailed. KROHNE's system impressed the customer both in terms of performance and measuring dynamics as well as the initial acquisition and on-going operating costs. Due to its optimized cuvette measuring system, the TUR 1060 is able to detect changes in turbidity very quickly. It is optimally designed for this application's lower turbidity measuring range.

The OPTISYS TUR 1060 was integrated into the process via a bypass line (online measurement). The measuring system determines the turbidity in accordance with the Drinking Water Ordinance by scattered light measurement (nephelometry). The light scattering of a formazine suspension whose concentration is known is compared with the light scattering in the drawn water sample. The measurement takes place at a 90° angle to the irradiated light (90° infrared scattered light according to ISO 7027). Since the measuring optics are not directly exposed to the sample, they are only subject to low maintenance. To further minimize the need for maintenance, the KROHNE system also features automated ultrasonic cleaning.

Communication to the control room is via an analogue 4...20 mA output signal. Relays are also used for limit value monitoring and alarming and a trend recording is captured and available to the customer via a USB port.



Scattered light measurement according to ISO 7027



Online turbidity measurement with the OPTISYS TUR 1060

4. Customer benefits

With the help of the OPTISYS TUR 1060, the customer can consistently monitor and detect drinking water turbidity. The very quick response time of the system ensures that the water purveyor can react immediately when turbidity increases. If defined limit values are exceeded, the measuring system triggers a warning or alarm in the control room. In this way, the customer always succeeds in complying with its strict quality management to ensure that the turbidity does not exceed a value of 0.2 NTU. Thus, a high level of drinking water safety is guaranteed.

The OPTISYS TUR 1060 not only impressed the customer with its attractive price-performance ratio as compared to other measuring devices available on the market, but its comparatively low metering system operating costs also offered this water purveyor a clear long-term advantage. The design and the integrated ultrasonic cleaning minimizes deposits and simplifies the cleaning effort significantly. The KROHNE system also has an integrated shut-off valve for calibration and to check the cuvette quickly and easily as necessary. This saves a great deal of effort during maintenance. KROHNE provides certified test kits for cuvette calibration from a single source.

5. Product used

OPTISYS TUR 1060

- Optical turbidity measuring system for potable water applications
- Rapid response time due to small measurement volume
- Online bypass installation: 0...100/1000 NTU/FNU; max. +50°C / +122°F
- 90° infrared scattered light (ISO 7027) or white light (US EPA 180.1)
- 4-wire, 4...20 mA, 2 alarm relays, Modbus via RS485, USB; integrated data logger



Contact

Would you like further information about these or other applications?
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